

FORM PTO-1390 (Modified)
(REV 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

990348

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5)

09/423274

INTERNATIONAL APPLICATION NO.
PCT/DE98/01182INTERNATIONAL FILING DATE
24 April 1998PRIORITY DATE CLAIMED
25 April 1997

TITLE OF INVENTION

Application and Method for Checking Security Documents with Effective Optical Diffraction Security Layer

APPLICANT(S) FOR DO/EO/US

PUTTKAMMER, Frank

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☒ Other items or information:

a.) Post Card Receipt

420 Rec'd PCT/PTO 25 OCT 1999

International Application No.: PCT/DE98/01182
International Filing Date: 24 April 1998
Priority Date: 25 April 1997
Inventor: Puttkammer, Frank
For: Application and Method for Checking Documents...

Preliminary Amendment Prior to Claims Fee Calculation

Sir:

With a view to avoiding otherwise necessary claims fee surcharges
Applicant courteously requests entry of the following amendment into the
claims of his instant international application:

Claim 6, line 1: change "one or several of claims 1 to 5" to --claim 1--;

claim 11, line 1: change "one or several of the preceding claims" to
--claim 1--;

claim 12, line 1: change "one or several of the preceding claims" to
--claim 1--; and

claim 13, line 1: change "one or several of the preceding claims" to
--claim 1--.

Respectfully submitted,



Karl Hormann
Registration No.: 26,470

Area Code (617)-491-8867

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(f) AND 1.27 (c)) - SMALL BUSINESS CONCERN**

Docket No.
990348

Serial No.

09/423,274

Filing Date

25 October 1999

Patent No.

Issue Date

PCT

Applicant/ PUTTKAMMER, Frank

Patentee:

Invention: Application and Method of Checking Documents with Effective Optical Diffraction Security Layer

I hereby declare that I am:

- ☐ the owner of the small business concern identified below:
- ☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: WHD elektronische PrueftechnikADDRESS OF CONCERN: Industriestrasse 19, D-01129 Dresden, Germany

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the above identified invention described in:

- ☐ the specification filed herewith with title as listed above.
- ☒ the application identified above.
- ☐ the patent identified above.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed on the next page and no rights to the invention are held by any person, other than the inventor, who could not qualify as an independent inventor under 37 CFR 1.9(c) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ no such person, concern or organization exists.
☐ each such person, concern or organization is listed below.

FULL NAME
ADDRESS

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME
ADDRESS

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME
ADDRESS

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME
ADDRESS

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Gert Fleege
 TITLE OF PERSON SIGNING: Managing Director

OTHER THAN OWNER:

ADDRESS OF PERSON SIGNING: Industriestrasse 19
D-01129 Dresden, Germany



elektronische Prüftechnik GmbH
 Industriestraße 19 • D-01129 Dresden
 Tel. (03 51) 8 49 15 58 • Fax (03 51) 8 49 15 96

SIGNATURE: X

DATE: 09.22.1999

Gert Fleege, Managing Director

USE OF AND METHOD FOR TESTING OF DOCUMENTS WITH DIFFRACTION-
OPTICALLY EFFECTIVE SAFETY LAYERS

This invention relates to a use of and a method for testing of documents.

To date, documents with diffraction-optically effective safety layers, in particular holograms, have been tested with costly optical testing equipment. In these procedures, the test object has to be positioned very exactly. The entire testing process takes so long that these test procedures cannot be used in high-speed processing machines. Testing of, for example, banknotes with a hologram authenticity feature in a banknote counting machine is impossible, as it runs at high speeds between 500 and 1500 banknotes per minute and above. A method and device of forge testing holographically protected identity cards is disclosed in DE 27 47 156. The hologram is reproduced and a visual check is carried out. This method is not suited to high-speed, efficient, person-independent testing. A device for generating scanning patterns which are tested by means of laser, mirror and lens system as well as a photodetector is described in EP 0 042 946. The economic expenditure is also in this case very high. It would increase further if the test objects are to be tested without prior sorting. To avoid presorting, the forge test system would have to be arranged several times.

It is the object of the invention to eliminate the disadvantages of the prior art and to propose a use, and a method of testing, of documents with diffraction-optically effective safety layers, in particular holograms, which can be tested rapidly, person-independently and inexpensively. The device is intended for use in document testing devices and

00423274-042946

money processing machines as well as manual test units for testing documents with diffraction-optically effective safety layers.

This problem is solved by the features given in the characterizing clause of claim 1.

Holograms and other diffraction-optically effective safety layers for the protection of certificates and other securities as well as banknotes against forging are now used more and more widely. Rapid testability is another safety stage in the valuation of diffraction-optically effective safety layers as a feature of authenticity. Diffraction-optically effective layers are composed of a metallized layer, among other things. This metallization layer is electrically conductive. The electrical conductivity changes with the thickness of the layer. The diffraction-optically effective layer has a discontinuous metallization layer and/or partially metallic layers and/or zones of metallic layers in different planes. Various measuring methods to determine an electrical conductivity are known. In practice, the non-contacting, capacitive measuring method has proved useful. This method of testing safety documents utilizes the capacitive coupling between transmitter and receiver and the transfer of energy between transmitter and receiver by bridging an electromagnetic field by electrically conductive safety materials. A downstream electronic evaluation system compares the signal picture of the test object with relevant reference signals. The comparison provides a classifying signal for reprocessing. Therefore, a document detected as a forgery, for example, could be sorted out by stopping the test device. The signal picture depends on the structure of the metallized layer of the diffraction-optically effective layer. If the diffraction-optically effective layers have a discontinuous metallization layer, several segments of the metallization layer have different electrical conductivities. Practice has shown that these different conductivities have an effect on the signal picture.

The testing reliability is further increased by combining the electrical conductivity test with other authenticity features of the diffraction-optically effective layer. The application of additional authenticity features into demetallized segments within discontinuous metallization layers and/or partially metallic layers and/or between zones of metallic layers in different planes allows the simultaneous testing of these features with the electrical conductivity. By means of the electronic evaluation system, an authenticity signal of another sensor for the authenticity determination is logically combined with the sensor for measuring the electrical conductivity. At the output of the electronic evaluation system, a signal classifying the diffraction-optically effective layer is available for reprocessing. This additional authenticity feature has fluorescent, phosphorescent or light-absorbing properties or differs from its surroundings by different magnetic properties. Therefore, an optical or magnetic sensor is used. To reduce detecting and measuring errors, a sensor carrier is used preferably. This sensor carrier accommodates all sensors required for the detection of authenticity features. This allows the distances between the sensors to be minimized and the sensors always to be arranged in defined positions. To avoid interference effects, the sensor carrier is firmly connected to the mounting plate holding the electronic evaluation system. The entire test device is arranged within the processing machine so that no additional expenditure for the transport of the test objects is required.

The features of the invention will appear from the description and drawings in addition to the claims, the individual features as individual or several things in the form of subcombinations representing advantageous, patentable embodiments for which protection is claimed here. The invention will now be explained in greater detail with reference to an embodiment thereof which is represented in the accompanying drawings, wherein

- Fig. 1 is a schematic section through a processing machine with test device
- Fig. 2a is a schematic section through a hologram with demetallized segments
- Fig. 2b is a voltage-time diagram of the evaluation signal
- Fig. 3a is a schematic section through a hologram with discontinuous metallization layer
- Fig. 3b is a voltage-time diagram of the evaluation signal
- Fig. 4a is a schematic section through a hologram with UV authenticity feature
- Fig. 4b is a voltage-time diagram of the evaluation signal of the electrical conductivity test
- Fig. 4c is a voltage-time diagram of the evaluation signal of the UV sensor

The testing method according to the invention provides that appropriate sensors are installed in suitable positions of banknote counting machines. The sensors for the detection of electrical conductivity are designed in such a way that the sensor can test the banknote independently of the position of the banknote. Optical or mechanical sensors detect the presence of a banknote and provide a reference signal for the timing of the test device 4. Simultaneously, the sensors for the forge test of the hologram are activated. Recording the entire time window from the beginning of the banknote to its end allows the position of the hologram of the banknote to be determined.

It is shown in Fig. 1 how the test device 4 is arranged on the path of banknote transport. The banknote counting machine comprises a feed wheel 1, transport wheels 2, a banknote guiding device 3 and a test device 4.

Fig. 3a shows a schematic section through a hologram with a carrying layer **11** and a discontinuous metallization layer **14**. The discontinuous metallization layer **14** comprises segments **15, 16, 17, 18, 19** with different electrical conductivity.

Fig. 4a shows a schematic section through a hologram with a carrying layer **11** and a discontinuous metallization layer **20**. The discontinuous metallization layer **20** comprises demetallized segments **21** as well as additional authenticity features. These authenticity features are fluorescent paints **22** which are excited in the test by means of UV light and are detected by means of photosensors. Preferably, the additional authenticity features are located within the demetallized segments **21**. Fig. 4 b shows the relevant evaluation signal of the capacitively working sensor testing the electrical conductivity in a voltage-time diagram. Fig. 4 c shows the response of the evaluation signal of the photosensor in a voltage-time diagram.

In the present invention, the testing of documents with diffraction-optically effective safety layers was explained with reference to an embodiment thereof. It is to be understood, however, that the present invention is not limited to the details of the description in the embodiment, as alterations and modifications are claimed within the scope of the patent claims.

We claim:

1. Use of the method for the testing of documents using the capacitive coupling between transmitter and receiver and the transfer of energy between transmitter and receiver by electrically conductive safety materials wherein for the forge test of documents with diffraction-optically effective safety layers with a discontinuous metallization layer (14) or partially metallic layers (12, 20) or zones of metallic layers in different planes the electrical conductivity is determined and evaluated.
2. The use of the method as claimed in claim 1 in which for the forge test of documents with diffraction-optically effective safety layers with a discontinuous metallization layer (14) and partially metallic layers (12, 20) the electrical conductivity is determined and evaluated.
3. The use of the method as claimed in claim 1 in which for the forge test of documents with diffraction-optically effective safety layers with a discontinuous metallization layer (14) and zones of metallic layers in different planes the electrical conductivity is determined and evaluated.
4. The use of the method as claimed in claim 1 in which for the forge test of documents with diffraction-optically effective safety layers with partially metallic layers (12, 20) and zones of metallic layers in different planes the electrical conductivity is determined and evaluated.

5. The use of the method as claimed in claim 1 in which
for the forge test of documents with diffraction-optically effective safety layers
with a discontinuous metallization layer (14) and partially metallic layers (12, 20)
and zones of metallic layers in different planes the electrical conductivity is
determined and evaluated.
6. The use of the method as claimed in one or several of claims 1 to 5 including
the testing of additionally applicable authenticity features within demetallized
segments within discontinuous metallization layers (14) and/or partially metallic
layers (12, 20) and/or between zones of metallic layers in different planes.
7. The use of the method as claimed in claim 6 including
the testing of the fluorescent properties of the additionally applicable authenticity
feature.
8. The use of the method as claimed in claim 6 including
the testing of the phosphorescent properties of the additionally applicable
authenticity feature.
9. The use of the method as claimed in claim 6 including
the testing of the light-absorbing properties of the additionally applicable
authenticity feature.
10. The use of the method as claimed in claim 6 including
the testing of the magnetic properties differing from the surroundings of the
additionally applicable authenticity feature.
11. The use of the method as claimed in one or several of the preceding claims in which
the diffraction-optically effective safety layer is a hologram.

12. The use of the method as claimed in one or several of the preceding claims including

the testing of holograms in high-speed processing machines with a speed of up to 2000 documents per minute.

13. The use of the method as claimed in one or several of the preceding claims including

the testing of holograms in manual units.

14. A method for testing of documents using the capacitive coupling between transmitter and receiver and the transfer of energy between transmitter and receiver by electrically conductive safety materials in which a document to be tested which has a diffraction-optically effective safety layer with a discontinuous metallization layer (14) and/or partially metallic layers (12, 20) and/or zones of metallic layers in different planes is guided in such a way that it passes through an electronic sensor system at a defined speed, energy is capacitively transferred from one or several transmitting electrodes to one or several receiving electrodes via metallization layers, the signals available at the receiving electrode or electrodes are amplified by means of an electronic evaluation system and are compared with a reference signal and a signal classifying the document is available for further processing at the output of the electronic evaluation system.

15. The method as claimed in claim 14 in which

a document with diffraction-optically effective safety layers is tested in at least two different test directions.

16. The method as claimed in claim 14 in which

by means of the electronic evaluation system the classifying signal is logically combined with an authenticity signal of an additionally applicable authenticity feature after it has been tested by means of another sensor and a combination signal classifying the document is available at the output of the electronic evaluation system for further processing.

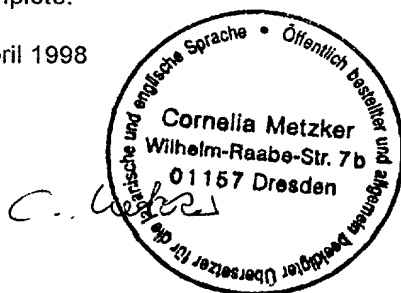
Summary

This invention relates to a use of and a method for testing of documents. To date, documents with diffraction-optically effective safety layers, in particular holograms, have been tested with costly optical testing equipment. The entire testing process takes so long that these test procedures cannot be used in high-speed processing machines. Rapid testability is another safety stage in the valuation of diffraction-optically effective safety layers as a feature of authenticity. The diffraction-optically effective layer has a discontinuous metallization layer and/or partially metallic layers and/or zones of metallic layers in different planes. Various measuring methods to determine an electrical conductivity are known. In practice, the non-contacting, capacitive measuring method has proved useful.

The translation comprises nine (9) pages.

I, a translator of the English and Japanese languages who was officially appointed and generally sworn by the President of the Regional Court of Dresden, do hereby certify that the above translation of the certificate submitted to me as a copy and drawn up in the German language is correct and complete.

Dresden, 14 April 1998



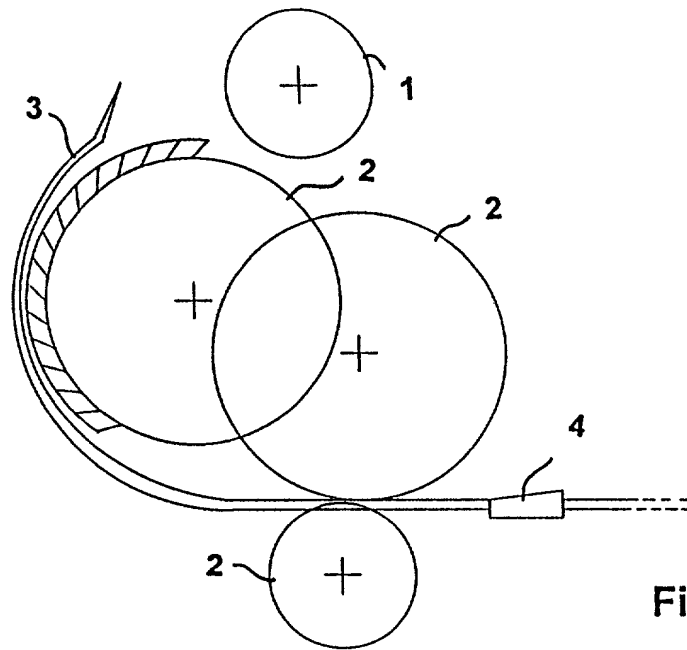


Fig. 1

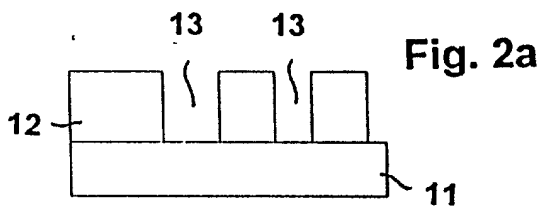


Fig. 2a

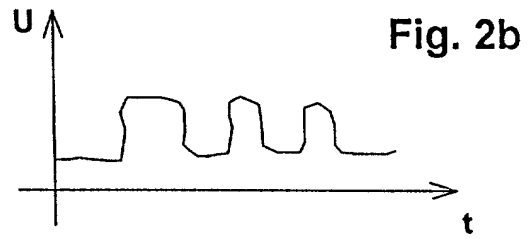


Fig. 2b

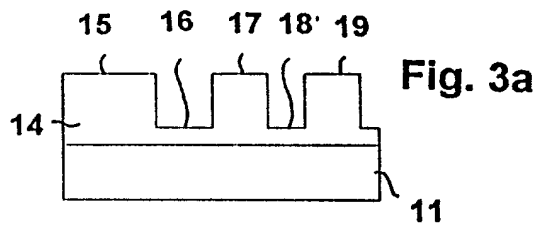


Fig. 3a

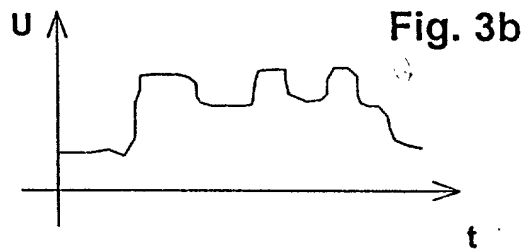


Fig. 3b

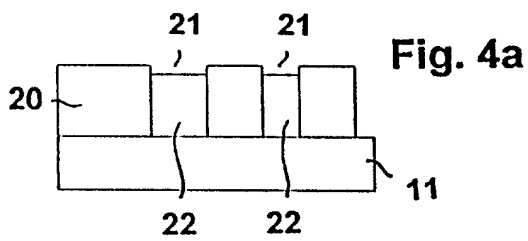


Fig. 4a

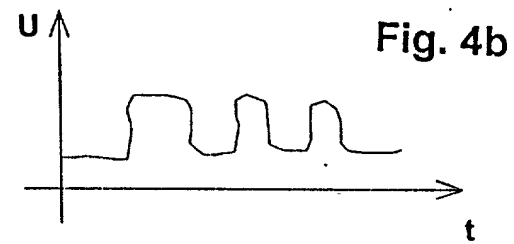


Fig. 4b

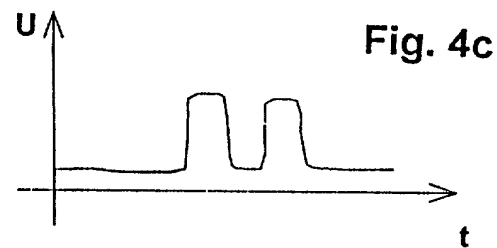


Fig. 4c

00260423274

Docket No.
990348

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Application and Method of Checking Documents with Effective Optical Diffraction Security Layer

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 25 October 1999 as United States Application No. or PCT International Application Number 09/423,274 and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

<u>197 18 916.4</u>	<u>Germany</u>	<u>25 April 1997</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional

N/A

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

PCT/DE98/01182

24 April 1998

Pending

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

① **Karl Hormann, Registration No.: 26,470**

Send Correspondence to: Law Offices of Karl Hormann
86 Sparks Street
Cambridge, MA 02138-2216

Direct Telephone Calls to: *(name and telephone number)*
Mr Hormann @ (617)-491-8867

Full name of sole or first inventor

PUTTKAMMER, Frank

Sole or first inventor's signature

X

Date

23.09.1999

Residence

Kastanienstrasse 19, D-01640 Coswig, Germany DEX

23 September 1999

Citizenship

German

Post Office Address

same as residence

Full name of second inventor, if any

N/A

Second inventor's signature

Date

Residence

Citizenship

Post Office Address